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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

PATEL, SHEFALI D

ART UNIT PAPER NUMBER

2621

DATE MAILED: 07/16/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/669,395

Applicant(s)

ARGIRO ET AL.

Examiner

Shefali d Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09/26/00.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14, 28-41 is/are rejected.
- 7) ☒ Claim(s) 15-27 and 42-54 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 and 3. 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: on page 25 lines 6-7, elements 508 and 510 are not shown in the figures. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to because Figures 1 and 5 does not meet the requirement of acceptable size of the margins. See 37 CFR 1.84(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities: On page 6 line 17, "system 200" ought to be "system 100" according to Fig. 1. On page 9 line 9, "image processor system 204" ought to be "image processor system 206" according to Figure 2. On page 11 line 13, "(FIG. 1)" should be "(FIG. 2)."

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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5. Claims 1-2, 6-11, 28-29, and 33-38 are rejected under 35 U.S.C. 102(b) as being anticipate by Sheehan et al. (USPN 5,533,085).

With regard to **claim 1**, Sheehan et al. (hereinafter, "Sheehan") discloses a method for selecting images of a portion of a cardiovascular system (Note, Sheehan discloses an angiograph system where cardiac cycles are obtain. According to the Merriam-Webster's Dictionary®, both angiography and cardiovascular is an analysis of the blood vessels.) comprising: receiving from an image scanner a plurality of images recorded over a period of time (see for example, col. 5 lines 47-62, where Sheehan discloses a detector 30 in which image intensifier 32 and video camera 38 is included to record images over a period of time, also shown in Fig. 1.), the images representing one or more location along the extent of the cardiovascular system (col. 7 lines 17-18 where different viewing angles of the heart is being monitored); and selecting at least a subset of the images based on common criteria determined from the plurality of images (at col. 7 lines 15-17, Sheehan states: "it should be noted that the software can be used to select images occurring either before or after end systole and end diastole and that the term "specific image" as used in this specification and in the claims that follow is intended to encompass any image referenced by *predefined criteria* (emphasis added by the examiner) relating to portions of the cardiac cycle." What this means is that, Sheehan selects any image, which obviously includes portion of the images, according to a predetermined criteria; and further more Sheehan does select the subset of the image, see the description made at col. 8 lines 3-5 and col. 9 lines 28-34. The frames are being selected for end systole and end diastole and without reference to an external signal (it is clearly noted at col. 7 lines 19-25 that a reference to an external signal is not made as Sheehan uses a medical practitioner instead of an EKG monitor.).

Claim 10 recites identical features as claim 1 except claim 10 is a method for ordering. Thus, arguments similar to that presented above for claim 1 is equally applicable to claim 10. Additionally, Sheehan discloses deriving a cardiac cycle signal from the plurality of scanned image (See for example, col. 9 lines 18-20) and assigning a phase in the cardiac cycle to each scanned image (in accordance with applicants' own disclosure phase is derived from the image data by detecting motion in the image, see page 12 lines 14-17 of the specification. Sheehan detect the motion of the heart as it contracts (end systole) and as it expands (end diastole) as seen in Fig. 8 and 7, respectively, and Sheehan shows the phase of each frame in Figs. 9-11 by using a spatial analysis method, and thus Sheehan assigns a phase in the cardiac cycle to each scanned image.

Claim 28 recites identical features as claim 1 except claim 28 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 1 is equally applicable to claim 28. Sheehan discloses computer-readable medium (See col. 6 lines 40-67, also shown in Fig. 1).

Claim 37 recites identical features as claim 10 except claim 37 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 10 is equally applicable to claim 37. Sheehan discloses computer-readable medium (See col. 6 lines 40-67, also shown in Fig. 1).

With regard to **claim 2**, Sheehan discloses the method of claim 1, wherein the portion of the cardiovascular system is the heart (See col. 5 lines 33-34).

Claim 11 recites identical features as claim 2 except claim 11 is a method for ordering. Thus, arguments similar to that presented above for claim 2 is equally applicable to claim 11.

Claim 29 recites identical features as claim 2 except claim 29 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 2 is equally applicable to claim 29.

Claim 38 recites identical features as claim 11 except claim 38 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 11 is equally applicable to claim 38.

With regard to **claim 6** Sheehan discloses a method wherein selecting a subset of the images results from a determination of the blurriness of each image. Sheehan does disclose evaluating the arteries from the background of the images depending on the brightness (i.e., blurriness). (See for example, col. 8 lines 44-58).

Claim 33 recites identical features as claim 6 except claim 33 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 6 is equally applicable to claim 33.

With regard to **claim 7** Sheehan discloses a method wherein the blurriness of the image is determined by a Fourier transform (hereinafter, "FT") applied to the image. Sheehan applies FT to the image (See col. 14 lines 58-63). The blurriness of the image is obtained from here because Sheehan states: "The exact total edge length in the block can be estimated by summing all of the frequency components for the block." As mentioned before in claim 1, the total edge length is used in selecting a subset of the image.

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Claim 34 recites identical features as claim 7 except claim 34 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 7 is equally applicable to claim 34.

With regard to **claim 8** Sheehan discloses a method wherein the blurriness is determined by the mean pixel difference between the image and an adjacent image. Sheehan first obtains the difference between the pixels within the row and a column of the image (see for example, col. 11 lines 22-30) and then repeats this process for each frame (See col. 14 lines 40-45). Thus, Sheehan teach finding a difference between the image and the adjacent image.

Claim 35 recites identical features as claim 8 except claim 35 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 8 is equally applicable to claim 35.

With regards to **claim 9** Sheehan discloses a method wherein selecting a subset of the images results from a determination of a change of a relative position of at least one vessel edge in each image by showing the change, see Figures 7-8, in the motion of the heart (i.e., Systole and Diastole). The relative position of at least one vessel edge is changing as the heart contracts (Systole) and expands (Diastole).

Claim 36 recites identical features as claim 9 except claim 36 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 9 is equally applicable to claim 36.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3-5, 12-14, 30-32, 39-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheehan in view of Ben-Haim et al. (US 2002/0165448).

With regard to **claim 3**, Sheehan discloses all of the subject matter recited in claim 1. Sheehan does not expressly disclose image scanner being a CT scanner. However, Ben-Haim et al. (hereinafter, "Ben-Haim") teaches the provision of CT scanner for the purpose of acquiring images on page 10 paragraph 186 line 14. Sheehan and Ben-Haim are combinable because they are from the same field of endeavor, i.e., medical imaging. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teaching of Ben-Haim with Sheehan. The motivation for doing so is to allow acquiring the images as suggested by Ben-Haim in paragraph 186 on page 10. Therefore, it would have been obvious to combine Ben-Haim with Sheehan to obtain the invention as specified in claim 3.

With regard to **claim 4** Sheehan discloses all the subject matter claimed except for image scanner being a MRI scanner. Ben-Haim et al. teaches the provision of MRI scanner for the purpose of acquiring images on page 10 paragraph 186 line 14.

With regard to **claim 5** Sheehan discloses all the subject matter claimed except for image scanner being an ultrasound scanner. Ben-Haim et al. teaches the provision of ultrasound scanner for the purpose of acquiring images on page 10 paragraph 186 lines 13-14.

Claim 12 recites identical features as claim 3 except claim 12 is a method for ordering. Thus, arguments similar to that presented above for claim 3 is equally applicable to claim 12.

Claim 13 recites identical features as claim 4 except claim 13 is a method for ordering. Thus, arguments similar to that presented above for claim 4 is equally applicable to claim 13.

Claim 14 recites identical features as claim 5 except claim 14 is a method for ordering. Thus, arguments similar to that presented above for claim 5 is equally applicable to claim 14.

Claim 30 recites identical features as claim 3 except claim 30 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 3 is equally applicable to claim 30.

Claim 31 recites identical features as claim 4 except claim 31 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 4 is equally applicable to claim 31.

Claim 32 recites identical features as claim 5 except claim 32 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 5 is equally applicable to claim 32.

Claim 39 recites identical features as claim 12 except claim 39 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 12 is equally applicable to claim 39.

Claim 40 recites identical features as claim 13 except claim 40 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 13 is equally applicable to claim 40.

Claim 41 recites identical features as claim 14 except claim 41 is a computer-readable medium claim. Thus, arguments similar to that presented above for claim 14 is equally applicable to claim 41.

Allowable Subject Matter

8. Claims 15-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The closest prior art to Sheehan directed to a method for selecting/ordering a plurality of images of a portion of a cardiovascular system comprising deriving the cardiac signal. However, Sheehan says nothing about segmenting a set of data in each image to derive the cardiac signal. While the reference to Ben-Haim (US 2002/0165448) describes plurality of signals corresponding to drive signals (See page 6 paragraph 120), an ordinary artisan would not be motivated to combine Ben-Haim with Sheehan because Ben-Haim as well does not use segmentation to derive the signal. Neither Sheehan nor Ben-Haim applies the claimed computation of a change value in the image by segmenting a set of data in each image for deriving the cardiac signal. These features in combination with all of the other elements of the claims are not disclosed or fairly suggested by the closest prior art of Sheehan and would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Claim 42-54 recites identical features as claims 15-27 except claims 42-54 are a computer-readable medium claim. Thus, arguments similar to that presented above for claims 15-27 are equally applicable to claim 42-54. Thus, they are allowable for the same reasons.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

USPN 5,570,430 – Method for determining the contour of an in vivo organ using multiple image frames of the organ.

USPN 6,393,091 – Method for non-uniform temporal cardiac imaging.

USPN 6,154,516 – Cardiac CT system.

Cios et al. , “A Novel Algorithm for Classification of SPECT images of a Human Heart” 1996, IEEE, 1-5.

Belohlavek et al. “Multidimensional Ultrasonic Visualization in Cardiology,” 1992, IEEE, 1137-1145.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shefali d Patel whose telephone number is 703-306-4182. The examiner can normally be reached on M-F 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H Boudreau can be reached on 703-305-4706. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

Shefali Patel
July 11, 2003



Daniel Mariam
Primary Examiner
Art Unit 2621